

Patent Claims

1. Exhaust gas turbocharger for an internal combustion engine,

with at least one turbine provided on the exhaust gas side downstream of the internal combustion engine,

wherein the turbine (2) includes a flow channel (13) with at least one radial flow cross-section (13a)

with a nozzle ring (7) bordering the radial flow cross-section (13a),

wherein a variable guide vane assembly (5) is provided for the variable adjustment of the radial flow through cross-section (13a)

thereby characterized

that a compensation ring (20) is provided, which is displaceable axially in the direction towards the guide vane (5).

2. Exhaust gas turbocharger according to Claim 1, thereby characterized, that the compensation ring (20) is provided in a recess (21) of the nozzle ring (7).

3. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that at least one piston ring (22) is provided on an internal diameter and/or on an outer diameter of the compensation ring (20), via which the compensation ring (20) is sealed against the nozzle ring (7).

4. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the axial moveability of the nozzle ring (7) is defined by at least one abutment or stop (23, 24).

5. Exhaust gas turbocharger according to Claim 4, thereby characterized that a first stop (23, 24) is formed by a recess

(21) in the nozzle ring (7), whereby a movement of the compensation ring (20) in a first direction is preset.

6. Exhaust gas turbocharger according to one of Claims 4 or 5, thereby characterized that a second stop (23, 24) is formed by the surface of the guide vanes (5), whereby a movement of the compensation ring (20) in a second direction opposite to the first direction is predetermined.

7. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that between the guide vane assembly (5) and the compensation ring (20) a space exists, which upon maximal extension of the compensation ring (20) lies in the range of at a few tenths of millimeters.

8. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the compensation ring (20) exhibits a smaller outer diameter and/or a larger inner diameter and/or a smaller weight than the nozzle ring (7).

9. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that an actuation mechanism (26, 27, 28) is provided, via which the compensation ring (20) and/or the nozzle ring (7) is pneumatically or hydraulically axially displaceable.

10. Exhaust gas turbocharger according to Claim 9, thereby characterized that the actuation mechanism (26, 28) includes a pipeline (26) and/or a hollow screw (28) connected with the compensation ring (20), via which the compensation ring (20) is acted upon by pressure (P1, P3).

11. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that an internal

pressure supply device is provided, which provides an internal gas pressure (P3) from the exhaust gas flow in the flow channel (13), which is supplied in particular via a pipeline (26) and/or a hollow screw (28) to the compensation ring (20).

12. Exhaust gas turbocharger according to Claim 11, thereby characterized that the determination of the amount of the internal gas pressure (P3) is self regulating based on the exhaust gas flow in the flow channel (13).

13. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that an external pressure supply device (26, 28, 30) is provided on the exhaust gas turbocharger (1), which provides an external gas pressure (P1), which is supplied to the compensation ring (20) via a pipeline (26) and/or a hollow screw (28).

14. Exhaust gas turbocharger according to one of Claims 11 through 13, thereby characterized that a control device is provided, by means of which the amount of the gas pressure (P1, P3) is controlled depending upon the motor output and/or by the desired motor brake power and/or the distance between the guide vane assembly (5) and compensation ring (20).

15. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the compensation ring (20) is coupled rigidly with the nozzle ring (7) or is a component of the nozzle ring (7).

16. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the nozzle ring (7) is a component of the housing of the exhaust gas turbocharger (1).

17. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the nozzle ring (7) is connected directly with the housing of the exhaust gas turbocharger (1) by means of securing elements, in particular by means of screws.

18. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that a vane ring is provided, upon which the guide vanes (6) of the guide vane assembly (5) are mounted, wherein the vane ring (6) is not connected to the nozzle ring (7) and/or the compensation ring (20).

19. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that the moveable guide vanes (6) of the guide vane assembly (5) are mounted one sidedly on the vane ring and essentially contact only the compensation ring (20), however not the nozzle ring (7).

20. Exhaust gas turbocharger according to one of the preceding claims, thereby characterized that besides the radial flow cross-section (13a) also a semi-axial flow cross-section (13b) is provided, wherein the nozzle ring (7) defines the effective cross-section of the radial and the semi-axial flow cross-section (13a, 13b).